

**Summary Minutes of the  
U. S. Environmental Protection Agency  
Science Advisory Board (SAB)  
Advisory Council on Clean Air Compliance Analysis (Council)  
Special Council Panel for the Review of the Third 812 Analysis (Council Panel)  
Public Meeting  
November 5-6, 2003, Hilton Washington Embassy Row, Washington, DC**

Council Panel Members: (See Roster – Attachment A)

Date and Time: 8:30 a.m. - 4:45 p.m. November 5, 2003 and 8:00 a.m. - 4:00 p.m. November 6, 2003 (See *Federal Register Notice* – Attachment B)

Location: Hilton Washington Embassy Row  
2015 Massachusetts Avenue, NW  
Washington, DC 20036

Purpose: (1) To receive an update on a draft report by the Council's Health Effects Subcommittee (HES); (2) to review and take action on a Council Special Panel Report "Interim Installment: Review of the Revised Analytical Plan for EPA's Second Prospective Analysis – Benefits and Costs of the Clean Air Act 1990-2020" and (3) to provide advice to the Agency on remaining charge questions related to its review of the Revised Analytical Plan for EPA's Second Prospective Analysis y

Attendees:

Chair:	Dr. Trudy Cameron
SAB Members:	Ms. Lauraine Chestnut Dr. John Evans Dr. James Hammitt Dr. Dale Hattis Dr. F. Reed Johnson Dr. Charles Kolstad Dr. Lester Lave Dr. Virginia McConnell Dr. D. Warner North Dr. V. Kerry Smith
SAB Staff:	Dr. Angela Nugent, Designated Federal Officer Dr. Vanessa Vu, SAB Staff Office Director

Other Participants (In Order of Appearance on Agenda):

Mr. James DeMocker, OAR

Mr. Jim Neumann, IEC

Dr. Albert McGartland, NCEE

Ms. Lisa Conner, OAQPS

Meeting Summary

The discussion generally followed the issues as presented in the Meeting Agenda, with some modifications (See Meeting Agenda - Attachment C). The meeting lasted until 4:45 p.m. on November 5, 2003 and until 3:15 p.m. on November 6, 2003. No public comments were submitted to the subcommittee.

Opening of Council Panel Meeting

Dr. Angela Nugent, Designated Federal Officer (DFO) for the Council Panel, opened the meeting at 8:30 a.m. and she welcomed meeting attendees. She stated that the Council Panel is a federal advisory committee empowered to provide advice to the Administrator whose meetings are public by law. She reviewed FACA requirements the Council Panel's compliance with Federal ethics and conflict-of-interest laws. Dr. Nugent said that part of her role as DFO was to be present during Council Panel business and deliberations. Records of Council Panel discussions are maintained and summary minutes of the meeting will be prepared and certified by Dr. Trudy Cameron, Council Panel Chair. The summary minutes will be available to the public in approximately one month, she said. A full transcription of the Council Panel will also be available, although it is not certified for accuracy. No members of the public asked to address the Council Panel, and no written comments were submitted.

Dr. Nugent reported that Drs. Evans, Hattis, North, and Wallsten were added to the Council Panel to provide additional expertise in the areas of statistical probability and risk assessment. She noted that the ethics office concluded that no conflict of interest or lack of impartiality exists in the Council Panel. Dr. Nugent asked Council Panel members to inform her if the discussions touched on their personal research or some other point arises that might lead to a conclusion that a lack of impartiality exists. Dr. Bart Ostro, Chair of the Council's Health Effects Subcommittee, will be providing a report of its activities by telephone to the Council Panel. She noted for the record that Dr. Ostro had recused himself from discussions concerning HES charge question 29 because of concerns for the appearance of a lack of impartiality, and she said that Dr. Nino Kuenzli would provide a report by telephone on that question.

Welcome

Dr. Vanessa Vu, SAB Staff Office Director, welcomed Council Panel members and thanked them for their valiant efforts over the past several months. She expressed appreciation on behalf of the Acting Administrator. Dr. Vu thanked Dr. Nugent, Mr.

James DeMocker, and other Agency staff who have been instrumental in the 812 analysis review process. She also thanked members of the public for their interest.

#### Review of Meeting Purpose, Agenda

Dr. Cameron expressed appreciation to Council Panel members and Agency staff for their dedication in the work to date on the Council Panel's report. She noted that the main business before the Council Panel is first receiving briefings from Agency personnel and an update on the HES draft report, with the bulk of the meeting time dedicated to addressing the remaining charge questions.

The members of the Council Panel introduced themselves.

#### Background Briefings on Topics Requested by the Council Special Panel

##### *Update on Project Status and Timetable, Clarification of Key Terms*

Mr. James DeMocker, Office of Air and Radiation (OAR), noted that preparation of the draft analytical plan was originally supposed to be a simple review process. The three Council subcommittees were to meet in June; however, emerging events required more time to address issues. He noted that the Agency's thinking on several issues, as a result, differs from the plans identified in the document provided to them in May and revised in June. Mr. DeMocker commented that there is an unavoidable disconnect since the formal document is old.

Mr. DeMocker proceeded with an overview of the Section 812 project update, summarized by slides. He listed the planned project team briefings and topics to be covered. In describing the current legal status of Clean Air Act Amendments (CAAA) section 312, Mr. DeMocker stated that technical amendments in 1997 after the 1995 Sunset Act seemed to eliminate the requirement to report to Congress periodically with an 812 analysis. Now there is an ambiguous legal situation because Congress had a number of amendments reinstated. While the Department of Justice completed a review, the EPA's General Counsel concluded that the bulk of 312 remains intact, including subsection (e) that requires developing the report. Mr. DeMocker said that while the legal status of the reporting requirements is being sorted out, the commitment remains to conduct business as usual on the Section 812 project.

Mr. DeMocker provided a chart comparing the benefits analysis terminology used in the First 812 Prospective to that of the Non-Road Diesel Regulatory Impact Analysis (RIA). He reviewed the use of the terms: Primary Estimate, Primary Central, Primary Low and Primary High in the First Prospective. In the Non-Road Diesel RIA, the term Base Estimate matches the Primary Estimate. Additional elements of uncertainty analysis are provided through the Alternative Estimate.

In response to a question, Mr. DeMocker clarified that the Non-Road Diesel RIA was already out as a proposed rule and he said that a number of analytical changes are

expected before the final rule in April. The particulate matter (PM) expert elicitation process may provide input on some alternative methods to consider. He said that advice received from the Council Panel would be relevant to the final rule. Dr. Nugent asked if the Non-Road Diesel RIA would be peer reviewed in some other context. An EPA staff member responded that many of the methods have been peer reviewed. Mr. DeMocker stated that the new draft OMB bulletin requiring external peer review of all RIAs is not final, but it does not appear that the Non-Road Diesel RIA will be subject to its provisions.

Mr. DeMocker briefed the Council Panel on the Computable General Equilibrium (CGE) model choice, noting that updated models may be available by the time a model is selected in approximately mid-2004. The plan calls for consultation with the Council Panel in early 2004. In response to a question, Mr. DeMocker said that the CGE analyses are planned to be conducted late in the analytical sequence since the available tools constantly improve. The Agency is open to advice, however, from the Council Panel on whether the choice should be made earlier. He said that the Jorgenson-Ho-Wilcoxon model is a leading candidate as a competent tool, available in-house that has already been peer reviewed.

Mr. DeMocker reviewed both the previous and updated project schedules, noting that the final report is currently expected to be released on the 5-year anniversary of the first 812 analysis. A Council Panel member asked for clarification on what input the Agency is seeking from the Council Panel. Mr. DeMocker said it would be helpful if the Council Panel would reconsider some elements of its previous advice, given the time that has elapsed in the process.

#### *Update on Alternative Pathway and Scenario Planning*

Mr. Jim Neumann, Industrial Economics, Inc. (IEc), provided information on scenario definitions for the Second Prospective Analysis via a slide presentation. He outlined some changes to the scenario definitions and he identified some issues the Agency has been struggling with. Mr. Neumann provided a graph illustrating a conceptual schematic of several 812 scenarios that now includes several post-CAAA scenarios. The definition of post-CAAA had been modified, and several valuable supplemental trends are included. Mr. Neumann reviewed the pre-CAAA scenario and the emissions trends for sulphur dioxide.

There was a brief discussion of the relationship between projected trends and actual economic activity. Mr. Neumann said that the impact of the economic downturn was misjudged for some sectors and he stated that facts have been incorporated to the extent there is actual data for particular sectors. Concern was expressed by some Council Panel members that credibility would be lacking if projected levels of activity that were never realized are used in the proposed scenario. Mr. Neumann said that in some cases it is a matter of waiting for data to be published. Mr. DeMocker stated that the data are being recalibrated to 1999, which is the latest available year of emissions reporting data from the states.

In constructing the post-CAAA scenario, Mr. Neumann explained that the pre-CAAA scenario is the basis. Layers are then added for national controls, regional controls, and additional controls for non-attainment. The purpose of the analysis is to determine where there is a need for additional measures at local level, not to measure whether attainment is achieved. A Council panel member asked if the figures assumed 100 percent compliance. Mr. Neumann responded that in some cases 100 percent compliance figures are used and in other cases an 80 percent rate is assumed. Mr. DeMocker affirmed that the effective assumption is that each facility is making 80 percent of the reductions called for, which captures willful non-compliance as well as other factors.

Mr. Neumann stated that there is an important major change to the NAAQS compliance component. The 1997 revisions to the PM and ozone NAAQS will not be included in the post-CAAA scenario because of uncertainty factors. Instead, the intent is to use the "beyond-the-CAAA" federal level control scenario to help the Agency determine the air quality shortfalls in individual non-attainment areas that would have to be remedied to comply with the NAAQS revisions.

A Council Panel member encouraged the Agency to attempt to address in a broad fashion what would happen with no implementation, full implementation, and partial implementation of the NAAQS.

Mr. Neumann explained projected PM assumed non-attainment in the post-CAAA scenario for 2020, noting that local maps for PM compliance are not included because the network is insufficient to determine who is out of compliance (e.g. no counties in Texas are listed because there is no data that covers the past 3 years). If all existing programs are incorporated, the result based on current data is 43 non-attainment counties. The lack of monitoring data is an important factor, he said.

A Council Panel member questioned the omission of the 1997 NAAQS standards on ozone and PM because of uncertainties in the implementation plans, and he suggested that something short of a national analysis such as a demonstration based on available data, could be considered. Mr. DeMocker explained that there are no full attainment runs from the 1997 standards and he said there is great uncertainty on the national and local levels today as to what the likely measures would be. Further, it is unknown whether "Clear Skies" will pass, which will have an impact. He described the NAAQS compliance component as a baseline to which a number of different scenarios will be added, not a single control case. The process will be clarified over the next couple of months, he said. Jim Neumann added that a key problem is the lack of data from the modeling network to determine what would be required for attainment in specific areas.

Mr. Neumann described the "beyond-the-CAAA" scenario, where layers would be added to the post-CAAA scenario by focusing on federal measures beyond required emissions reductions.

A discussion followed concerning the proposed baseline and alternative pathways as a means to inform development of the implementation plans for the NAAQS revisions. Several Council Panel members expressed concern over the proposal. One member commented that it is unclear what is the baseline and what is the next level; therefore it is difficult to evaluate the proposal. Mr. Neumann said that the configured base is an area where there is a fair level of certainty about how the data will play out through 2020, as opposed to the local level where there is significant uncertainty. Another member said that under the proposal, calculating and attributing benefits and costs of supplemental measures that are not legally required would be vastly different from those calculated if a "maximum PM" baseline was used. He further asserted that fairness in the final calculation would require a second computation of the actual supplementary benefit of the various components. Mr. Neumann agreed that consideration of this point was warranted. Dr. Cameron suggested further dialogue during discussion of the draft report.

#### *Discounting Methodologies in 812 Cost and Benefit Modeling*

Mr. Neumann presented a proposed application of discount rates and cost of capital in the Second Prospective, using slides. He provided an overview of the various methodologies to be used in cost estimates, benefits estimates, and net present value calculations. The methods proposed for cost estimates include non-utility point sources, mobile and area sources, a sensitivity test providing an alternative discount rate, and an optimization model of utility sources in IPM. Benefits estimates will incorporate discount rates for mortality valuation, Cost of Illness (COI), acidification, and timber management. Mr. Neumann also described the Title VI Stratospheric Ozone implementation plan. He concluded with a comparison of the Net Present Value (NPV) calculations in the first prospective and second prospective.

In response to a question, Mr. Neumann said that no decision had been reached on how to treat agricultural issues, and he welcomed suggestions from the Council Panel.

#### *Discounting and Net Present Value Concepts and EPA Analytical Policies*

Dr. Albert McGartland, National Center for Environmental Economics (NCEE), used a slide presentation to illustrate the Agency's analysis of the dominant discounting concepts. As a follow-up to earlier discussions, he first stated his opinion that Non-Road Diesel RIA would not be subject to the draft OMB peer review proposal.

Dr. McGartland provided an overview of the three major discounting concepts the Agency considered, previous recommendations including the previous Council's suggestion of a 5 percent discount rate, and the Council's recent discounting discussion. He described Lind's "shadow price of capital" framework, which he said easily extends to public regulation. He concluded that the applied shadow price of capital reflects the Agency's understanding of what the SAB has recommended.

A Council Member emphasized the importance of consistency across modeling forms, noting that treatment of capital and dynamics will greatly impact consideration of

regulatory costs. He referred to recent discussions in a Council Panel conference call. In that context, Dr. McGartland stated that the Agency does differentiate between economic impact analysis and benefit-cost analysis (BCA).

#### *Particulate Matter Expert Elicitation Pilot Project*

Ms. Lisa Conner, Office of Air Quality Planning and Standards (OAQPS), provided an overview of the PM Expert Elicitation Pilot project, using slides. She also distributed a copy of the elicitation protocol. Ms. Connor described the purpose of the SAB review, the program development history, and the elicitation components. She noted that some components are necessarily missing because of the short timeline. The scope and focus were revised after input from the HES. Several methods were considered for selecting experts, she said, and the five members were selected from two National Academy of Sciences (NAS) panels to save time. In response to a question, Ms. Conner said that they had to go down to the seventh or eighth person on the list to secure the five experts.

Ms. Connor reviewed the factors that were considered in developing the protocol, the quantitative warm-up questions, and the alternative models of death attributable to air pollution discussed at the August HES meeting. She read the two elicitation questions, one on long-term exposures and one on short-term exposures, and she stated that follow-up questions would be asked to provide information for a full elicitation in the next phase. Ms. Connor said that the elicitation is scheduled for completion by the end of November with analysis of the results to follow. A draft report is expected by end of December, and the findings will be presented to the HES in January.

A Council Panel member thanked Ms. Connor for making the elicitation protocol available to the panel, and he commented that the addition of chronic and short-term effects is a very productive step in the right direction. He asked about the nature of the responses from the experts interviewed in terms of the elicitation process. Ms. Connor said that two elicitations had been conducted so far, and she noted that the general feedback was that they were able to answer the questions well. The responses will be analyzed together at the end of the process.

A break was taken at 10:35 a.m. Discussion resumed at 10: 50 a.m.

Dr. Cameron called on Mr. DeMocker, who had asked for an opportunity to elaborate on the NAAQS decision discussed earlier.

Mr. DeMocker clarified that the 1997 NAAQS for the Agency exists only as a collection of programs to achieve an analytical program and to set goals. Analysts must configure a number of federal programs and then must assume state activities, so there are many uncertainties. He acknowledged the concerns of the Council Panel and he said the plan calls for using a number of different calculations.

A Council Panel member stated that there is a state implementation requirement involved in the 1997 NAAQS but the Agency is unable to specify what the states are required to do. An attainment scenario cannot be specified, he said.

#### Update on HES Draft Report Other Than Charge Question 29

Dr. Ostro, HES Chair, joined the meeting by telephone to provide a summary of the HES recommendations contained in the HES Draft Report .

Dr. Ostro stated that the HES generally supports the EPA analytical plan regarding health assessments. The HES supports the addition of the new endpoints, the cohort-based mortality estimates, and the EPA plan for meta-analysis and possible use of ozone-related mortality. He commented that the effects of longer-term exposures are not captured in the estimates; ozone-related mortality is both acute and short-term exposures. There are three exceptions to the HES's support of the EPA blueprint. First, HES is against the absolute use of the expert elicitation of mortality effects. Second, HES supports adding infant mortality to base case. Third, HES supports adding asthma exacerbation as an endpoint, which is more probabilistic.

Dr. Ostro reported on some other HES recommendations, which include: 1) dropping the alternative analysis because sole use of time series studies does not fully capture effects, and 2) expanding age categories by extrapolation when there are sound physiological reasons to do so. The latter may affect baseline rates and some valuation issues, he said.

In response to a question, Dr. Ostro said final HES revisions are due to him by November 25, and some final editing will follow before the final draft is complete. A Council Panel member asked about the potential for overlap in attaching values to the endpoints such as emergency room visits and school time loss. Dr. Ostro responded that there is an attempt to subtract off the more severe outcomes.

While awaiting Dr. Kuenzli's arrival via telephone, Ms. Connor answered questions from Council Panel members.

A member asked if there was any interaction between the experts involved in the elicitation or if they received any feedback on their responses. Ms. Connor replied that the responses of each are immediately graphed and returned to the individual to ensure accuracy, but the information is not shared with the other experts. The member suggested that experts be provided with a comparison of their responses and published studies so the implications may be carefully considered where the responses contradict published work. Ms. Connor said that the warm-up questions provide an opportunity for the experts to review how other studies mesh with their own views.

Another Council Panel members expressed concern over the way exposures are characterized in the scenarios, since an expert may consider the assumptions questionable or the mechanisms incorrect. Ms. Connor replied that during the warm-up phase, experts are asked to think through the process before responding to the elicitation questions. The

elicitation asks for discussion of annual PM scenarios they should consider; different metrics can be used in evaluating the strengths and weaknesses of the cohort and time series studies. The pilot began as a part of the Non-Road Diesel RIA, with the hope that reasonable results could be applied to other rules. This is why there are not specific questions related to the Non-Road Diesel RIA, she said.

#### Update on HES Draft Report Discussion of Charge Question 29

*HES Charge Question 29. Does the Council support the plans described in chapter 9 for the expert elicitation pilot project to develop a probability-based pm 2.5 Concentration-Response (C-R) function for premature mortality, including in particular the elicitation process design? If the Council does not support the expert elicitation pilot project, or any particular aspect of its design, are there alternative approaches the Council recommends for estimating PM-related mortality benefits for this analysis, including in particular a probabilistic distribution for the C-R function to reflect uncertainty in the overall C-R function and/or its components?*

Dr. Kuenzli, HES Charge Question 29 Chair, stated that the HES generally supports the Agency's plan for the expert elicitation on the C-R function. He said the subcommittee expressed misgivings about the timeline as well as about the small number of experts to be elicited. The following points reflect other HES concerns: 1) study goals must be clearly defined; 2) scope of expert judgment questions must be very specific; 3) study questions should be disaggregated to address uncertainty; 4) time series and cohort studies should be considered separately; and 5) elicitors should have specific expertise in at least one arena of the elicitation. Dr. Kuenzli noted that HES rejected weighting responses from the experts.

A general discussion of the expert elicitation ensued. An apparent discrepancy was noted between the detailed answer to charge question 29 and the cover letter to the draft report concerning the level of support for the use of the expert elicitation. A Council Panel/HES member said that HES expressed concerns about using the pilot study for the 812 analysis and policymaking purposes. He also recommended that the Council Panel's advice on the matter should be simplified since the elicitation process is well underway.

Some members suggested that the experts should have an opportunity for discussions, perhaps during consideration of the warm-up questions or a workshop. Other members argued that Conferences among experts prior to the elicitation typically leads to convergence rather than a fair representation of uncertainties. A Council Panel member commented that a very common procedure is to have one elicitor play 'devils advocate.' It was also noted that feedback through computation of responses is most effective with disaggregated questions. Disaggregated questions will also reveal how experts conceptualize questions.

Dr. Cameron read a portion of written comments submitted to HES by Dr. Thomas Wallsten, a Council Panel and HES member, concerning the warm-up questions: "The preparation seems very complete, but with one important omission. Not enough is done

to cause the experts to question their own views. In addition to asking judges to outline the evidence that supports their opinions, explicitly ask them what evidence contradicts their views; what are the dominant opposing views, what evidence supports them, etc. The point is to help the expert to weigh all sides of the issues and to keep contradictory evidence in mind to the extent possible."

In response to a question, Dr. Nugent clarified that of the 37 charge questions, some are for consideration by Air Quality Modeling Subcommittee (AQMS), some are for HES, and some for the Council Panel. Four supplementary members of this panel are members of HES. HES cannot report directly to the Administrator, but rather must go through the Council for discussion at a public meeting. She said that it is likely a teleconference will be held in December, although the timing of subsequent deliberations is uncertain.

A member suggested endorsing the elicitation methodology, but not necessarily the results, noting that it is premature to conclude that the results can be used because it is a learning process. What standard will be used to determine whether the results are "reasonable" and thus useful? Questions remain on how the results will be reviewed and evaluated. It is unknown until the next step is taken whether the results will lead the Agency to alter their uncertainty assumptions, he said. Another member agreed and said that the Council Panel should seek, and help design a review process.

A Council Panel member asserted that the process moves the Agency and the public beyond the current discussion of uncertainties, so it is hard to imagine that it will not have impact on cost discussions. Whether the results are sufficiently definitive for rulemaking is another matter, he said.

Members commented that the follow-up questions seem carefully thought out and the Agency staff is to be commended. A member suggested that the Council Panel make a statement for the record supporting the pilot elicitation, but not for its use in the short term. He further suggested saying that the ultimate use of the elicitation can be discussed more fully in light of what is learned from the pilot. Another member advised the Agency to use caution in characterizing and using the expert judgments in policy analysis. Experts may protest if the questions they were asked and the answers they provided are distorted in the policy arena, he said.

Dr. Cameron asked Dr. Kuenzli to specifically address with HES the question of how the pilot will be used.

Mr. DeMocker stated that there may be disconnects between the elicitation and questions to be addressed in the 812 analysis, and he said the Agency would certainly consult the Council Panel and HES before applying any results.

Dr. Cameron thanked Dr. Ostro and Dr. Kuenzli for their participation.

Dr. Nugent reminded Council Panel members that a working lunch had been scheduled at their request, and she noted that discussions would resume after a brief break.

A break was taken for lunch at 12:00 noon. The discussion resumed at 12:20 p.m.

Charge Question 22: Expert-judgment Project on VSL Determinations

Dr. Cameron turned to a discussion of the charge questions.

Mr. DeMocker reported that the VSL project had been dropped from the blueprint, so that aspect of charge question 22 is not part of the current plan.

Dr. James Hammitt, lead discussant, characterized the question as one of the role of expert-judgment versus meta-analysis. Expert-judgments are most useful when there are no existing studies on the issue to be addressed, he said. There are several meta-analyses concerning VSLs that seem to be appropriate for purposes of the 812 report.

Dr. Cameron, associate discussant, stated that the larger issue of the value of a statistical life (VSL) construct that is most useful to policy considerations is individual willingness to pay (WTP). The problem with most meta-analyses is that VSLs are extrapolated and the resulting proportionally scaled WTP amounts are often averaged to produce a single value. Massaging a single statistic from each study and combining it across studies to determine the size of risk reduction benefits is not advisable, she said. Dr. Cameron described her biggest concern based on her personal research as the issue of heterogeneity. It is important to develop meta-analyses that will enhance understanding of how individual WTP for risk reductions varies along all of the dimensions of heterogeneity. She suggested as a longer-term goal pulling back from VSL and using WTP as a multi-variable function to avoid losing so much valuable information on risk reduction benefits. Marginal distribution of VSLs will have a high variance, and it is possible to make progress in reducing this variance over the long term. Dr. Cameron noted that it would be unfair, however, at this juncture to expect the Agency to do a complete turn-around within two weeks and apply VSLs differently.

A general discussion of the charge question ensued. Disagreement was expressed over whether or not the data were adequate. A member said that currently only point estimates and not marginal WTP can be identified. Another member said that data are in fact available on WTP in cases of accidental death and she suggested that this may be an avenue where an expert elicitation would be valuable, not just on questions of quality of life or environmental health risk.

A member expressed disagreement with selecting a triangular or half cosine distribution as a characterization of uncertainty. He suggested taking one or more observations from each study and determine what difference the various alternative approaches would make. A regression model could be used to illustrate the variance of conditional expectations, for example, across the meta-analyses to determine the effects of distinguishable study characteristics on the resulting VSL estimates. The member expressed strong opposition to the proposed distributions as easily misconstrued. To produce estimates across different classes, it is important to first identify what is being measured and how the

numbers can be consistently combined. This usually means using an algebraic model for a consistent set of terms. Another member said that such a variation has to be relevant to the policy and relate to actual risks affected by that policy.

A member commented that triangles are not for distribution or variability. Trying to describe what happened in some functional form would be helpful. Abstracting a large number of studies would be a big job.

Dr. Cameron suggested that members distinguish between what is to be done for the 2004 report versus the long term. She expressed the consensus of the Council Panel that the Agency look into this issue further. Dr. Cameron stated that part of the prerogative of the Council Panel is to advise the Agency on preferred methods.

A Council Panel member said that these are important research questions to address; however an examination of the available literature would probably reveal more unexplained than explained differences, in part because of cross study variations. Not much progress would be made with the literature we have, she said. Another member stated that several meta-analyses are available, and average income is the factor that affects results. That is one source of variation in VSL that can be controlled for and can be separated out. VSL can be applied for income using one meta-analysis, he said.

A Council Panel member suggested a straightforward regression analysis to summarize uncertainties in the database. For example, consider three variables from a meta-analysis. Explain VSL using an indicator of risk, calculate how far this risk is from the mean, make assumptions about the second and third variable. If we extrapolate far away from the region of risks where observations are made, we can determine how the variance on predicted VSL increases. Another member suggested that there is also a question of how to determine a point estimate of VSL relevant to the policy. The whole joint distribution and not just the marginal variance should be considered. He said that there is a problem with the \$6.3 million estimate for VSL as well.

Mr. DeMocker clarified that the draft plan presents \$10 million as an upper bound. It differs from current EPA guidelines and what was done in the first prospective. Adjusted for inflation, \$4.8 million translates to \$6.3 million. The default assumption is lower and does not just reflect a difference in variance.

#### Charge question 27: Pilot Project for Estimating and Reporting Uncertainty in Compliance Cost

Dr. Virginia McConnell, lead discussant, described the pilot project on costs outlined in chapter 9 as EPA's first cut at examining uncertainty with respect to costs. The analysis focuses on engineering cost estimates. Several aspects of the proposal are unclear including what uncertainties are being measured, whether cost functions are estimated, where the data are coming from, and what knowledge would be gained from the exercise. Dr. McConnell expressed concern that the estimates of uncertainty on the engineering costs will be the only reported uncertainty in the final costs, which would be misleading.

In terms of costs, much is known about engineering costs but little is known about technology costs. Prices (and thus general equilibrium effects) and productivity changes are left out, which is very important to uncertainty analysis, she said. Although other scenarios will address some of these issues, it is important to sort out these factors. Dr. McConnell suggested looking at uncertainty in learning to help determine the magnitude of indirect costs.

Dr. Charles Kolstad, associate discussant, echoed Dr. McConnell's remarks, adding that a focus on uncertainties in costs often leads to spurious estimates because of other more complex uncertainties. He referred to Morgenstern's work on biases in engineering costs, which showed that costs of new technology tend to be overestimated while existing technology costs are underestimated. Dr. Kolstad suggested that this should be considered in cost uncertainty.

Associate discussant Dr. Warner North said that it is very important to document uncertainties associated with compliance costs of present and future regulations. He commended the NAS report on uncertainty to the Council Panel. He noted that EPA is often criticized for too much precision on relatively unimportant factors and not having a balanced perspective on all factors, and he urged working toward a reasonably comprehensive short summary of analysts' views on compliance costs and benefits. The Agency essentially must address issues of what is in the model and how well it represents the "real world" to provide insight on the key factors contributing to uncertainty.

Dr. John Evans, associate discussant, endorsed Dr. North's comments. The issue becomes one of ensuring that uncertainty is not understated because of a focus on an aspect that ultimately may not matter. Consistency in dealing with uncertainty is essential, he said. Dr. Evans commented that the possibility that it is possible that factors not yet raised by the Agency or discussed by the Council might potentially have a major impact on the 812 analysis.

A general discussion of charge question 27 ensued. The importance of adequate documentation, particularly on assumptions made by engineers, was emphasized. Other panel members concurred with Dr. Kolstad's comments concerning biased estimates in terms of overestimation and underestimation of various costs, and suggested that these issues be systematically analyzed.

A Council Panel member commented that there is 35 years of experience in comparing engineering costs reflected in academic literature and wondered why the Agency did not incorporate this. He concurred that there is still vast uncertainty, but he said there should be a systematic, detailed overview of what was learned in previous experiences such as acidic deposition and technological changes related to sulphur dioxide. Several members emphasized the difficulties inherent in not knowing the source of the underlying data and thus the underlying uncertainty. It was noted that the lack of detail provided makes providing advice difficult. One member stated that the Agency has an enormous amount of information on addressing uncertainties in BCA, and he proposed giving the Agency relatively generic good advice and asking the staff to come back with a new chapter 9.

The discussion turned to consideration of the consistency of various modeling components. Council Panel members emphasized the need for consistency in assumptions related to C-R, mortality, and fate and transport. It was suggested that more information on these assumptions was needed for the Council Panel.

In response to a question, Mr. Neumann explained that the "comprehensive influence analysis" was an attempt to understand relationships and how costs are built up from their drivers so that research efforts can be better focused. Mr. DeMocker stated that the Agency's initial idea was alternative energy baselines, but the previous Council suggested characterizing the foundations and drivers that lead to uncertainty estimates.

A Council Panel member suggested using sensitivity analysis to determine which uncertainties are important and which are not without the necessity of a detailed formal analysis by the Agency. He said that summarizing various components, such as energy futures, and running a sensitivity analysis on the models will aid in understanding what will happen in the future.

In response to a question, Mr. DeMocker said that the number of sensitivity analyses that can reasonably be run depends on the scenario. Air quality models usually require several months and thousands of dollars; however, there are several new tools such as CMAQ where the turnaround is a matter of weeks. He noted that OAR is developing other tools, e.g. BenMAP and REMSAD, which will provide a quick turnaround in sensitivity analyses for evaluation. The importance of developing these faster tools was emphasized.

A Council Panel member asked if the Agency viewed the sensitivity analysis as distinct from other uncertainty analysis or as similar to what is being put forward on costs and benefits in general. Mr. DeMocker said that the plan is to conduct a quantitative sensitivity analysis of key factors affecting overall cost to attain more than a point estimate. Mr. Neumann added the plan was to broadly examine potential uncertainty and conduct an analysis with varied parameters. A Council Panel member suggested that it is likely that other organizations are attempting to forecast future energy costs, such as the Department of Energy, and as such there may be useful models already available that would assist EPA in this proposal. Future natural gas prices appear to be a key factor in determining the effect of air pollution, he said.

A member urged EPA to move toward assigning probabilities to certain outcomes such as the asthma example discussed earlier. There was a brief discussion of latency and longevity, in which Dr. Ostro commented that extensive discussion had occurred in HES that concluded in general support for the Agency's plan. It was acknowledged that the most important period of exposure is unknown, although new work by Krewski examines different exposure profiles. Dr. Ostro said that in terms of cessation lag, three different effects of length of exposure are recognized but there is still great uncertainty that models are attempting to address. In response to a question, Dr. Ostro said that the steep decline in ER visits for acute asthma attacks resulting from better treatment may be

counterbalanced by the increasing number of uninsured patients who rely on ER treatment, so the existing data are still sound.

#### Discussion of Charge Question 21: Plans for Economic Valuation of Changes in Outcomes Between Scenarios

Lead discussant Dr. Reed Johnson stated that he interpreted charge question 21 as relating to the non-health endpoints of chapter 8. He noted that if resources are scarce, the focus should be on human health rather than relatively less important endpoints. The use of mean/median wage rates for worker productivity seems unnecessarily simple, and he said that EPA should evaluate empirical alternatives to using market wage rates for the value of time. Dr. Johnson suggested the geographic region for the acidification endpoint be expanded to assess physical impacts beyond the Adirondack region. The proposed approach to the materials damage endpoint plans to monetize soiling damages with new estimates of the demand for cleaning products and services. More recent studies are missing from the analysis, and Dr. Johnson suggested additional studies including one conducted by National Economic Research Associates. While value estimates can be somewhat difficult to obtain, at a minimum the endpoints should be catalogued, he said. Dr. Johnson called on Ms. Lauraine Chestnut to discuss the visibility endpoint.

Ms. Chestnut stated that quantified benefits from the improvement of visibility in the Second Prospective Analysis are limited to recreational visibility benefits in the primary estimates. The Agency has indicated that the available residential study values are deemed to be not as reliable. There are more current valuation studies available, and she recommended reviewing the available literature in order, quantitatively, to say as much as possible. She referred to McClelland's study as one that directly addresses the issue of aesthetics. Ms. Chestnut characterized the reluctance to use the literature as reflecting concern that people surveyed are not answering for themselves but rather estimating what is good for society as a whole. Contingent valuation and hedonic property value studies show that visible air quality is associated in people's minds with health effects. She asserted that when considered together, the body of literature shows that visibility has an important effect on property values and the information cannot be ignored or the aesthetic component presumed to be zero. Dr. Johnson expressed basic agreement but commented that aesthetic concerns of looking at smog cannot always be reliably separated from health concerns expressed by those who are surveyed.

A break was taken at 2:35 p.m. The discussion resumed at 2:50 p.m.

Discussion of charge question 21 resumed. There was consensus that further consideration should be given to additional studies particularly those in the west (on visibility) and in the east (on materials damage and acidification). It was noted that the regional character of these issues needs to be reflected. Evaluation of the visibility benefit for national parks based on the 1996 Smith-Osborne meta-analysis was suggested. Parsons and McConnell may offer a framework for considering contingent valuation and hedonic studies.

A Council Panel member suggested that the extent of overlap between mortality and morbidity might be appropriately considered in chapter 8.

#### Update on Council's new Ecological Effects Subcommittee

Dr. Nugent reviewed the process leading to the appointment of an Ecological Effects Subcommittee of the Council. Six candidates have identified themselves to date, and the SAB Staff Office has not started the formal short-list process for the subcommittee, which reports through this Council Panel. The intention is to have somewhat overlapping membership with the newly formed Committee on Valuing the Protection of Ecological Systems and Services (Committee), chaired by Dr. Domenico Grasso. Other related subcommittees are HES chaired by Dr. Bart Osstro and AQMS chaired by Dr. David Allen. The Committee met October 27-28, and she noted that Dr. Kerry Smith serves as a member.

At Dr. Cameron's request, Dr. Smith briefed the Council Panel on the Committee's deliberations. He commented that the Committee again had discussions that ecologists and economists had been having for decades with little reference to previous similar discussions. Dr. Smith is hopeful that the Committee will be productive, however.

#### Discussion of Charge Question 18: Plans for Analysis Described in Chapter 7

Lead Discussant Ms. Chestnut acknowledged that future advice related to this charge question would come from the newly formed committees. She said that chapter 7 focuses on conceptual issues and does not truly reflect even what is known in terms of qualitative information. While the dollar "bottom line" is unknown, there is some quantitative information on some components, such as pollutants that are of concern, as well as changes in emissions. This should be more clearly reflected, she said, in terms of the number of issues rather than the number of dollars. Ms. Chestnut said that regardless of the validity of a baseline study (e.g., Costanza et al.), it provides an estimate of total value of the earth's ecosystems. Air pollution is only a fraction of the total stress on ecosystems and only marginal changes to ecosystems will result (incremental changes in quality of services, not wholesale losses).

A Council Panel member asked for clarification about the proper scope of the Council Panel's advice, and he asked whether consideration of "placeholders" for the future Ecological Effects Subcommittee was appropriate. Dr. Cameron agreed with the general concept of placeholders for the upcoming expertise of subcommittee, but emphasized the primary obligation of the Council Panel to address the charge questions.

Mr. DeMocker noted that the case studies addressed in charge questions 19 and 20 are being pursued based on advice from last year's Council, and he said that efforts on those studies could be deferred pending consideration by the new subcommittee. Mr. DeMocker said that there have not been large expenditures or opportunity costs involved in preparing the case studies.

A Council Panel member suggested reorganizing the consideration of case studies. Ecologists complain that economists focus on commodity value. Waquoit Bay application seems directed at commodity effects. However, the C-R function can be separated and valued with the available data. In the Chesapeake Bay study, the connection between monetized value and the physical outcomes of the C-R function was clearer. The connection of ecosystem services and what can be valued using hedonic property values needs to be described. He suggested using the two competing approaches of Wyland and Sherhart as a point of reference.

A Council Panel member commented that EPA is faced with a big problem in terms of ecological benefits because valuation is so complex and unsatisfactory, yet benefits cannot be "zeroed out" because no one believes they are zero. He suggested that the case studies have no impact on the report, and he said it seems unfair to ask the 812 process to resolve the issues that have been debated for years. Another member raised the issue of nitrogen deposition, and he suggested that a more useful case study would be conducted at a site where air pollution has a bigger known effect.

A member supported including the case studies in the analysis, but suggested the taxonomy was inconsistent with the first report. He emphasized that the most important aspect of the Waquoit Bay study is the flux at the boundaries, not where the boundaries themselves are drawn.

In response to a question, Mr. Neumann said that the Waquoit Bay site was selected in part because there is a large body of research by ecologists on relevant endpoints. It was noted that the Chesapeake Bay is bigger and more significant overall but it has a relatively small national effect. A Council Panel said it is important for the Council Panel to recognize the parallels between the case studies and be consistent in its recommendations.

The issue of ecosystem effects on health, e.g. wildfires and agriculture, was also mentioned.

Another member said that the Council Panel should focus on how best to deliver information that will be useful for follow-up. Mr. DeMocker responded that the Agency's failure to monetize ecological benefits has been a source of criticism, and a new way to capture ecological impacts is needed. A Council Panel member commented that the case studies are ultimately useful only if some national scale benefit can be projected.

A member suggested the possibility of attempting to connect pollutants to ecosystem performance by looking at long-term ecological reserve databases. Another member suggested that it may be beneficial to work from the "top down" as well as from the "bottom up," and connect the results to the case studies. A Council Panel member cautioned against drifting too far from providing practical, achievable suggestions to the Agency, and he said that it is difficult to find situations where air pollution has had a large impact on ecosystems. Dr. Cameron remarked that since a previous committee

criticized EPA for vastly understating ecosystem effects, she defends the Agency's effort in this area.

#### Discussion of Charge Question 20: Hedonic Property Studies

Dr. Smith, lead discussant, commented that there are difficulties inherent in linking property value models and physical response relations. A large portion of the Chesapeake Bay model uses recreational effects and hedonic property value effect contrasted with visibility effects. The potential for overlap and thus double counting must be addressed.

A general discussion of charge question 20 ensued. A Council Panel member said that the nature of the impacts being considered can be characterized, although C-R data is lacking and nitrogen effects somewhat complicate the picture. In response to a question, Mr. DeMocker said that the Agency previously conducted a displaced cost analysis for nitrogen deposition in the Chesapeake Bay. The previous Council advised removing it from the analysis over objections to primary benefits estimates that relied on displaced cost.

A member cautioned that hedonic studies capture only qualitative things people notice and care about directly, so subtle effects may not be captured. Aspects of hedonic models were discussed, including people's perceptions of what can be seen and smelled, negative and positive perceptions of ecosystem preservation, and estimating over a general area.

#### Summary of Action Items; Preparation for Next Day

Dr. Cameron said alternative pathways could be further discussed if members felt that the topic was not fully addressed during morning briefings. She reviewed the planned agenda, noting that the Council Panel would begin drafting its report at 11:00 a.m.

Dr. Nugent reported that HES is finishing its report and would have a teleconference with the Council in December. She invited the staff as well as members of the public to join the Council Panel for dinner. She adjourned the meeting at 4:35 p.m.

#### Opening of Meeting/Administrative Business

Dr. Nugent called the meeting to order at 8:05 a.m. on November 6, 2003 and she reported that there was a change to the agenda. Mr. Robert Brenner, Deputy Assistant Administrator, EPA, was invited to provide an update on the legal aspects involved with Section 312.

Mr. Brenner, OAR, thanked the Council Panel for its invitation, noting that he would provide an overview of how its work is implemented and how it affects programs. Mr. Brenner has been involved with implementation since the CAAA initially passed. He commented that BCA initially was more of a slogan than a tool when it came to public

policy, with some arguing that it limited the Agency's ability to regulate while others considered it essential. The debate has come a long way. The series of 812 analyses show that BCA can be very helpful for policymaking, and they show that control programs have huge benefits. He mentioned several programs that have been positively affected, including PM, mobile sources, and toxics. In the latter programs, residual risks have been de-emphasized in order to focus on community toxics programs and identification of high risks. There is tremendous community interest in diesel, he said, and there is a significant commitment to diesel issues in the pending Energy bill. Mr. Brenner said that while the Agency is not able on its own to completely establish its own priorities, SAB activities help provide effective tools. He thanked the Council Panel on behalf of OAR and himself for their work in supporting Agency BCA in the public policy arena. Mr. Brenner then responded to questions from Council Panel members.

A member asked for input on how the Council Panel could be most helpful both informally and in the broader context on general BCA and the Non-Road Diesel RIA considering the legal questions surrounding the 812 analysis. Mr. Brenner stated that although the reporting requirement to Congress seemingly no longer exists under section 812 of the CAAA, there is a strong Agency intent to conduct these analyses in part as a means to assess performance. He commented that these types of formal reports do not attract the personal attention of members of Congress, but it is rather when the information is used by Congressional staff in preparation for hearings and appropriations strategies. Further, the information is written up in environmental and public policy newsletters and thus becomes part of the discussions on the state and local level on what is appropriate in the clean air arena. Mr. Brenner said that from his perspective, he is comfortable with the idea of the Council Panel providing formal responses to charge questions as well as other comments. He suggested that the Agency should be given an indication of whether informal comments reflect the view of one or two individuals or a consensus of the panel.

A Council Panel member cautioned the Agency to be quite careful about limiting use of peer review advice. He expressed concern that the Agency may be using the Council Panel's advice as a peer review. He said that the Council Panel may want the opportunity to qualify its recommendations before extending them to other methodologies.

The member also suggested that the 812 process should include more proposals for staff development of new methodologies.

Mr. Brenner agreed that it is important to find ways for staff to work on developing new methodologies; however, extensive work on rulemaking often makes this difficult. He is hopeful that there will be some ability to free up staff time after the MACT standards for toxics are completed in March and the Non-Road Diesel RIA reaches the next phase. Mr. Brenner also acknowledged that it is somewhat unfair to take Council Panel judgments from one context and apply it to possibly unrelated matter; however, efficiency often requires that the Agency do so. He suggested that the Council Panel list general areas of applicability and urge caution in others for specific reasons. The Council Panel member suggested the reverse, where the Agency proposes a class of problems or suite of areas

for which the advice is sought. Mr. Brenner and Mr. DeMocker expressed willingness to work on implementation of this idea.

A Council Panel member asked that the Agency consider formalizing the Council Panel's role in BCA and perhaps extend it outside the 812 process, rather than forming a new committee. He also noted that a program-by-program analysis has been discussed as well. Mr. Brenner explained the statutory limitations to Agency initiation of BCA, and he suggested that providing advice on focusing additional work in net benefits would be most beneficial. Another member suggested that the 812 analysis may provide a vehicle for bridging new methods in BCA to specific issues. It was mentioned that the Council might consider ways to provide its analysis to CASAC, which advises the Agency on criteria pollutants and important research priorities in that area.

A Council Panel member raised the issue of public acceptance of BCA, noting that quantifying health benefits in non-monetary units is both consistent with economic theory and more politically acceptable. Mr. Brenner agreed that the public expects policy to be based on efficiency, and he said it is important in that context for both physical and monetized effects are expressed. He acknowledged the difficulty of making non-monetized benefits part of the debate.

Dr. Cameron thanked Mr. Brenner for his participation.

#### Discussion of Charge Question 23: Use of VSL Estimates Meta-analyses

Noting that the previous day's discussion had covered the general issues, lead discussant Dr. Smith focused his comments on the role of Kochi et al. and other published meta-analyses. There is an important distinction between using the meta-analyses as a guide and using the results in analysis, he said, and the notion of keeping track of variances and computing variances is very important. As a practical matter, Dr. Smith stated that it is wise to focus principally on published studies rather than unpublished material. He therefore recommended focusing on Viscusi-Aldy and the U.S. studies rather than Kochi et al. Other areas of concern include variance of conditional expectation and aggregate income adjustment. More variations in income are observed outside the country, while limiting observations to the U.S. shows less clear income effects. The new VSL studies may be a place to start in identifying the need for supplementary data.

Dr. Cameron, associate discussant, said that it is difficult to separate this charge question and charge question 37, and she noted that her reaction to VSL and the meta-analyses is strongly colored by her recent research work. She expressed reluctance to use the unpublished data in Kochi et al., noting that other appropriate studies are available. Dr. Cameron recommended that EPA step back from a single VSL number and consider both context and heterogeneity. It is known that VSL is dependent on the nature of the risk and individual attributes, and there appears to be a measurable degree of heterogeneity with respect to awareness of different objective health threats in different regions.

Dr. Smith stated that Dr. Cameron's comments were especially important for the long term. There is a lack of good models for measuring morbidity not connected to mortality, especially disease from pollutants affecting health profiles prior to premature death. However, Dr. Smith reiterated the need to give practical guidance to the Agency and he suggested exploring the domain of the WTP function in the short term and considering types of research programs to deal with heterogeneity in the long term.

#### Discussion of Charge Question 31: Plans for Appropriate VSL Measures

Dr. Hammitt, lead discussant, stated that the meta analyses explicitly estimate the extent to which study characteristics influence estimated VSL. The Kochi et al. study assumes that the different studies included all measure the same VSL subject to varying degrees of bias and error. However, Viscusi and Aldy, 2003 only uses wage differential studies. Contingent valuation studies show that people appear to care more about some things than others but there is very little direct evidence on orders of magnitude. Longitudinal adjustments for income may need to be considered.

Associate discussant Dr. Smith said that the question is whether a single number or a range of single numbers should be used. Defining the appropriate endpoints is difficult, e.g. premature death is a very ill-defined endpoint. Health economics attempts to describe quality-of-life profiles in terms of patterns of illness and life expectancy. The endpoints should be considered as the quality of life with life extension. Conceptually, different values are expected from different endpoints so there is no single number to describe these things.

A Council Panel member agreed that there is likely heterogeneity in risk reduction values, but she said the variation cannot be empirically quantified with confidence at this point. She suggest that since advice is needed now, pick a value and provide a strong caveat of its limitations and uncertainties instead of spending a lot of time and attention trying to pick a number from perhaps the wrong set of numbers. Stated preference needs to be included and not ignored, however. She agreed that meta-analyses help narrow the unexplained differences between the studies. She agreed with using mean values when transferring from one sample to another, but heterogeneity must be considered when transferring the mean value to different populations. Further support was expressed for finding a number and moving ahead. The Council Panel should provide a multi-layered response specifically addressed to the 812 process and emphasize the need for more research on analytical tools in this area.

A Council Panel member disagreed with recommending a single number for VSL and suggested using a range. He noted that evidence shows that responses vary based on how the questions are asked, and therefore no single number across groups is going to be valid. There is wisdom in stating that the numbers are unknown and recommending a range rather than pretending there is a single representative number. Another member stated that there is growing evidence that interviewer bias is not an issue in carefully followed survey protocols. He recommended attempting to determine what to do about

contingent valuation studies when there are concerns about the ability to communicate risk.

Dr. Cameron clarified that her pragmatic advice is to consider how precise to be with a number for the 812 study and see how easily such a number be determined. She recommends being very explicit that the appropriateness of a single number VSL is in doubt and considering a set of weights within a universe of studies appropriate for the policy context.

There was a discussion of the term VSL and its connotations. Several members suggested developing a new term since VSL is not truly reflective of what is being measured. For example, the number of premature deaths is counted but the change in risk or life expectancy for an entire group is what is being measured not the value of an individual life. So the value of the change in risk and what one is willing to pay to make the trade-off should be characterized by a new term.

A member disagreed with using the adjustment for aggregate income growth because it is arbitrary and inconsistent with VSL as a marginal rate substitution (MRS). He suggested a broader look at health effects might be needed in the context of VSL because so much attention is focused on the C-R function on the mortality side.

Another member supported a broader look at health effects since the focus of the 812 study is how life lost is valued and the C-R function. He encouraged EPA to analyze life extension in terms of quality versus life extension in terms of quantity.

A Council Panel member commented that while there is uncertainty, the key question is whether enough is known about income, risk vulnerability, etc. to determine VSL. Contingent valuation estimates of VSL are smaller than wage differential estimates. The available set of VSL estimates may still be too sparse to reliably identify the effects of individual study factors.

Dr. Cameron stated that WTP for mortality/morbidity risk reductions is affected by latency in these risks and cannot be separated from the issue of individual discounting of future health and income. As the distribution of individual discount rates differs across groups, the distribution of WTP for latent risk reductions across groups will differ as well.

A member asserted that EPA should not be looking at wage differentials for risk because they may be biased downward. The uncertainty would be much larger than that for most other factors. Current tools in most cases are not capable of measuring marginal benefits, so the best possible conclusion based on available tools must be reached, he said.

"Value Of Mortality Rate Change (VMRC)" was proposed by a Council Panel member as a replacement for the term VSL.

The difficulties inherent in the VSL framework were acknowledged. One difficulty is that data are dependent on responses from reliable individuals, and experience has shown that it is very hard to get responses even from committed people. It is unrealistic to just throw the issue back to the Agency and say, "fix it."

A break was taken at 10:10 a.m. The discussion resumed at 10: 30 a.m.

Mr. DeMocker presented a slide giving the legislative language of proposed Congressional appropriation amendments on age differentiation. The Allen amendment has passed the House. It prohibits expenditures for a numerical estimate assigning monetary values for adult premature mortality that differ based on the age of the adult. The Durbin amendment is still in committee, and prohibits expenditures to derive such estimates. The amendments would apply to virtually all of the Agency's work, including 812. Laws passed as part of an appropriations bill are not subject to legal challenge, he said.

There was a general discussion of the implications of the amendments, should they become law. It was determined that although the specific wording is somewhat ambiguous, the intent of Congress is that the Agency focus on health effects and not age as an equity issue. Some Council Panel members felt that such a prohibition would distort the BCA process, while others believed it was not appropriate to consider the proposals to differentiate by age in the context of the 812 review.

A Council Panel member suggested that the Agency staff might more clearly understand what the issues are in terms of survival curves and WTP. Survival curves can be characterized by life expectancy changes; current WTP data includes risks manifest in later life. Future VSL could be monetized considering latency and other WTP factors, so an approximation could be made. Age when the individual experienced the future health risk as well as their current age would be factors.

There was concurrence that charge question 37, "Application of the Kochi et al. study meta-analysis and other studies to derive value of avoided premature mortality," had been adequately addressed within the discussion of charge questions 23 and 31.

#### Discussion of Charge Question 24: Plans for QALY-based Cost Effectiveness

Lead discussant Dr. Hammitt raised the question of why the Agency wants to do this and he concluded that it was the suggestion of OMB and the Council. Gold et al. provides a reference case for CEA. He suggested recommending that EPA try to match the reference case assumptions as closely as possible. He noted that workshops may be somewhat helpful, but he suggested some lower cost ways to achieve the same results such as conducting a literature review or using a generic health utility instrument. The Health Utilities Index or a similar index would allow mapping each health state through population surveys. Dr. Hammitt said that the proposed plan to calculate estimates for the four endpoints should also net out medical cost savings achieved through reduction in

the number of cases. The same approach should apply to ecological and non-health benefits.

Dr. Smith, associate discussant, did not recommend using QALYs. Rather than use QALYs, he suggested that a better, but still theoretically “wrong,” approach was an alternative: a weighted average of outcomes that are changed as a result of policy change. QALYs cannot be assumed to be independent of economic circumstances, and outcomes from C-R functions do not map into QALYs. How to convert a lost work day into a QALY equivalent is not addressed, while the proposed alternative at least has unit values that are associates for lost work days so that assumptions can be made about the baseline, he said. Quantity indexes should be developed using preference calibration or type of effect. Dr. Smith stated that QALYs are not based on consumer choice and thus can only be used for CEA and not benefit-analysis. In closing, he urged the Agency to evaluate alternatives to QALYs.

A Council Panel member stated that QALYs do not meet standards for use in the 812 Analysis. The issue of “WTP for a QALY” is a “slippery slope,” and he said recent new literature using VSL as a statistical WTP demonstrates astonishingly bad science. He suggested focusing on some type of cost per unit measure. Others concurred that dollar per unit makes more sense. Pressure to use WTP was acknowledged.

It was suggested that if the Agency proceeds with QALYs. They should be presented as an alternative rather than a cost analysis. The larger question is whether 812 should be just BCA or CEA also. If CEA is included, either QALYs or some VSL measure is necessary.

Another member suggested relative weighting without dollar values. The question is, how much disaggregation do we want to do? WTP may be the best method. People cannot really determine, and possibly do not care about, the value of life of a 7-year-old versus a 20-year-old. A different member disagreed, questioning the value of weighting an asthma attack. He agreed that value judgments would remain hard to assess from individual people. Others expressed the view that some CEA number would be helpful for decision makers and the public.

A member commented that private values versus social values are an important distinction, and age-dependent salience is also a problem.

A Council Panel member proposed a synthesis using available physical tables. The alternative would take WTP for all effects and calculate dollar per life year for the mortality effects. This method would not use QALYs, and it addresses the uncertainty about VSL and putting a value on mortality.

Mr. DeMocker clarified that the Council recommended that the Agency consider CEA using QALYs in 2001. It was recommended that CEA be conducted in terms of dollars per life-year.

## Discussion of Charge Question 25: Valuation of Morbidity Effects

Lead discussant Ms. Chestnut recommended the Agency use the Dickie and Ulery study on WTP as suggested, but she said it should be used along with other studies and not as a replacement. She said the Agency should do a comparison and reconcile the literature interpretation. Ms. Chestnut also suggested including a Canadian study, indicating it is an important and well-designed study that provides needed data within similar population characteristics.

Some economic valuation of asthma exacerbations will be needed because of the HES recommendation that the endpoint be part of the primary estimate. On the whole, studies suggest a reasonable range of WTP values for asthma symptoms, she said. HES has a statement about restricted activity days resulting from asthma exacerbations so the measure can at least be valued on that level. Ms. Chestnut said the body of literature on respiratory symptoms should be considered for valuation. In response to a question, she said that there are some ongoing studies that have not defined endpoints yet.

For nonfatal heart attacks, Ms Chestnut said the EPA approach is appropriate given what is known, but data should be reanalyzed because of the age of the study. A Council Panel member asked if new information was available on the distribution of days lost, since there have been major changes in length of recovery time. Ms. Chestnut said data on medical costs and wage rates have been updated, and lifetime wage rate differentials were analyzed for heart attack versus non-heart attack victims. An EPA staff member said that the Social Security Administration had planned to update their data but funding was cut. He also said it may be possible to re-analyze data for California.

Ms. Chestnut stated that HES considered the morbidity/mortality overlap of chronic bronchitis and concluded that there is a potential for overlap and a need for care to avoid double-counting. The chronic bronchitis study WTP is not based on mortality risk concern. An alternative estimate based on COI information that has been used by EPA in the past is a useful complement to WTP but is not an adequate alternative, she said. Ms. Chestnut said that use of WTP as a base and adding components such as shared social costs of health insurance and paid leave is something to be considered.

There was general discussion of the chronic bronchitis endpoint. Symptom descriptions within various studies were discussed, and it was suggested that a definition of the disease endpoint be specified and included. Dr. Ostro said that NAS has spent time on defining chronic bronchitis symptoms. A member commented that while there are positive aspects to the Dickie study, he urged caution in relying upon it too heavily in part because of the CV format and inconsistent reference conditions. Another member echoed those concerns, and he added that connections between adult and child values are problematic.

A break was taken for a working lunch at 12:10 p.m. The discussion resumed at 12:40 p.m.

Dr. Cameron asked Dr. Ostro to brief the Council Panel on the Rabl study.

Dr. Ostro stated that he and Dr. Kuenzli had drafted a response to a recent JAMA paper by Rabl related to the concept known as "harvesting." The paper shows that if there is a single exposure to air pollution, at the cohort level, one would see an increase of deaths within a couple of days that would be offset by fewer deaths later on, so the conclusion is that nothing can be said about death except in terms of timing. Dr. Ostro said that part of the problem is that the assumptions hold only if long-term exposures have an effect at the end of life, so it basically assumes there is no disease process in long-term exposures (an exception is made for lung cancer). There is increasing evidence from other studies that there is a relationship between exposures and the disease process, Dr. Ostro said.

Discussion of Any Remaining Issues with Draft Report "Interim Installment: Review of the Revised Analytical Plan for EPA's Second Prospective Analysis -- Benefits and Costs of the Clean Air Act 1990-2020"

Dr. Cameron called on Council Panel members to comment on any pertinent remaining issues. Dr. Nugent said that major points of the charge question responses would be captured and she said that a cover letter must be prepared as well.

The issue of NAAQS compliance was revisited. Some members had negative reactions to not including the 1997 NAAQS revisions in the post-CAAA scenario. A Council Panel member suggested preparing a formal recommendation to the Agency on the subject. A general discussion ensued. Reluctance to push the Agency into determining a minimum set of rules was expressed. Developing a plausible baseline and bracketing the high and low ends of the range was considered as a possible alternative. A Council Panel member suggested that a baseline is useful as an intermediate calculation but should not be mistaken as basis for comparison with pre-1990 controls. The potential impact of the Clear Skies program and other future legislation was mentioned. A Council Panel member suggested inviting the Agency staff to determine what is reasonable in the aggregate and what could be done to develop cost-benefit tools. A member responded that speculation on what could conceivably go into the post-CAA scenario is a "Pandora's box" activity that should not be recommended to the Agency. Concern was expressed that adding more pollutants into the scenario was too speculative. Dr. Cameron said that past Council advice avoided trying to project future legislation. Dr. Dale Hattis agreed to capture the major points of the NAAQS discussion to circulate to Council Panel members.

Discussion of Charge Question 1: Project goals and Analytical Sequence and Identification of Points for Administrator's Cover Letter

Dr. Nugent posted summary notes from the Council Panel's deliberations on a screen to assist in drafting its report and cover letter. The following topics were identified as potentially important to include in the Administrator's cover letter: 1) mortality risk valuation; 2) discounting; 3) QALY; 4) expert elicitation; 5) ecological effects, usefulness of effort underway; 6) scenarios; and 7) uncertainty.

Combining the two scheduled interim drafts into one draft was discussed. Dr. Cameron suggested it was dependent on Agency needs, but expressed her preference for one document. Mr. DeMocker said that one integrated advisory report would be more valuable since progress on the issues could be made in the intervening six weeks without an interim document. Dr. Cameron expressed the consensus of the Council Panel to wait and prepare one interim document. She said that the cover letter would be changed to add to the existing first interim cover letter.

The cover letter was discussed, and it was the consensus of the Council Panel to include the following points:

- 1) History, context, contributions historically of CAAA, citing OMB report.
- 2) Section 812 report now not a report to Congress, important report for EPA; framed approach to other RIAs; important educational role. Importance of supporting activity. Endorsement of periodic valuations.
- 3) Not an accounting exercise; creative synthesis; ambitious and difficult; results important for Administrator, Congress to understand.
- 4) Value is shaping future regulations and legislation, not justification of 1990 amendments. Aid to strategic planning for OAR programs.
- 5) Recognition in cover letter that Council has highlighted several technical points that deserve Administrator's attention e.g. valuation of health effects, scenario development, mortality risk valuation (important and controversial), QALY, uncertainty analysis and characterization, CGE, and discounting. Refer to AQMS, HES reports, range of charge questions.

Dr. Cameron asked all lead discussants to coordinate with other discussants and write up their sections for each charge questions, integrating material from meeting discussions and associate discussants. Teleconferences and an additional iteration will be held, with the document completed in 4-6 weeks. Format preference and other housekeeping matters were discussed.

A general discussion followed of the project goals and analytical sequence related to charge question 1. Points were raised from the previous discussions. The timing of the final HES report was considered in terms of the interim report.

In response to a question, Dr. Cameron encouraged Council Panel members to raise any important issues not addressed in the charge questions. The list of 189 HAPS (and its limitations) and the use of the benzene case study in the 812 analysis were discussed. Dr. Nugent read from an earlier Council draft response which contained advice related to air toxics and the Agency's plans to focus on a benzene case study. It was agreed that the Council advisory would incorporate a passage along similar lines related to advice on air toxics..

The discussion returned to compiling information for the draft interim report. Disaggregation and uncertainties in compliance costs were revisited. Mr. DeMocker

reviewed the proposal on disaggregation, noted that a number of scenarios would have to be run for disaggregation by major emitting sector. As a separate point, he asked the Council to distinguish in its advice specific recommendations that were priorities for the Agency to pursue in the current analysis, and those that were important to pursue in the future.

The consensus of the Council Panel relative to charge question 1, was summarized as follows:

- 1) Disaggregation by sector and program, especially estimating benefits where costs are significant. Amplification of program-specific partial disequilibrium costs and their utility. Disaggregation by major emitting sector, program, not region/geographic area.
- 2) Analytical sequence: Move choice of CGE model up; innovation of short turn around air quality models important and enhances sensitivity analysis; air toxics.
- 3) Scenarios: Advise bracketing strategy with very high control scenario (focused on ozone and PM) vs. 1990 CAAA prior to 1997 NAAQS

#### Summary of Action Items

Dr. Nugent listed the action items as follows:

1. For each charge question, lead discussants integrate material from discussion and associate discussants; provide to Trudy and Angela by 11/21
2. Dr. Cameron to redraft Council Advisory
3. The DFO to schedule a Council Teleconference
4. The DFO to suggest filename conventions; CQ##-AAA, for text to be provided by Council Members
5. Council members to provide full citations.
6. DFO to provide revised lists of leads for charge questions.

Dr. Cameron thanked all the meeting participants. The meeting was adjourned at 3:00 p.m.

Respectfully Submitted:

/s/ Angela Nugent  
Angela Nugent,  
Designated Federal Official

Certified as True:

/s/ Trudy Ann Cameron

Trudy Ann Cameron  
Chair

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by the Council members and consultants to the Agency during the course of deliberations within the meeting. Such ideas, suggestions and deliberations do not necessarily reflect definitive consensus advice from the Council. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final reports prepared and transmitted to the EPA Administrator following the public meetings.

## Attachments

Attachment A	Roster
Attachment B	<i>Federal Register</i> Notice
Attachment C	Meeting Agenda (which includes Charge Questions)

**U.S. Environmental Protection Agency  
Advisory Council on Clean Air Compliance Analysis  
Special Council Panel for the Review of the Third 812 Analysis**

**CHAIR**

**Dr. Trudy Ann Cameron**, Raymond F. Mikesell Professor of Environmental and Resource Economics, Department of Economics, University of Oregon, Eugene, OR  
Also Member: BOARD

**COUNCIL MEMBERS**

**Dr. David T. Allen**, The Gertz Regents Professor in Chemical Engineering, Department of Chemical Engineering, University of Texas, Austin, TX

**Ms. Lauraine Chestnut**, Manager, Stratus Consulting Inc, Boulder , CO

**Dr. James Hammitt**, Professor of Economics and Decision Sciences, Department of Health Policy and Management, School of Public Health, Harvard University, Boston, MA

**Dr. F. Reed Johnson**, Principal Economist and RTI Fellow, RTI Health Solutions, Research Triangle Institute, Research Triangle Park, NC

**Dr. Charles Kolstad**, Professor, Department of Economics, Bren School of Environmental Science and Management, University of California, Santa Barbara, CA

**Dr. Lester B. Lave**, Professor, Graduate School of Industrial Administration, Carnegie Mellon University, Pittsburgh, PA

**Dr. Virginia McConnell**, Senior Fellow; Professor of Economics, Resources for the Future, Washington, DC

**Dr. Bart Ostro**, Chief, Air Pollution Epidemiology Unit, California Office of Environmental Health Hazard Assessment (OEHHA), Oakland, CA

**Dr. V. Kerry Smith**, University Distinguished Professor, Department of Agricultural and Resource Economics, College of Agriculture and Life Sciences, North Carolina State University, Raleigh, NC

**OTHER SAB MEMBERS**

**Dr. Lawrence Goulder**, Shuzo Nishihara Professor of Environmental and Resource Economics, Department of Economics and Institute for International Studies, Stanford University, Stanford, CA

**Dr. Dale Hattis**, Research Professor, Center for Technology, Environment, and Development, George Perkins Marsh Institute, Clark University, Worcester, MA

**CONSULTANTS**

**Dr. John Evans**, Senior Lecturer on Environmental Science, Harvard University, Portsmouth, NH

**Dr. D. Warner North**, President, NorthWorks Inc, Belmont, CA

**Dr. Thomas S. Wallsten**, Professor, Department of Psychology, University of Maryland, College Park, MD

**SCIENCE ADVISORY BOARD STAFF**

**Dr. Angela Nugent**, Designated Federal Officer, 1200 Pennsylvania Avenue, NW, Washington, DC, Phone: 202-564-4562, Fax: 202-501-0323, (nugent.angela@epa.gov)

Attachment B *Federal Register* Notice

Science Advisory Board Staff Office; Advisory Council on Clean Air Compliance Analysis; Notification of Upcoming Public Teleconferences for Its Subcommittees and Special Panel and a Public Meeting for Its Special Panel and Air Quality Modeling Subcommittee

[Federal Register: October 7, 2003 (Volume 68, Number 194)]

[Notices]

[Page 57890-57891]

From the Federal Register Online via GPO Access [wais.access.gpo.gov]

[DOCID:fr07oc03-51]

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ENVIRONMENTAL PROTECTION AGENCY

[FRL-7569-5]

Science Advisory Board Staff Office; Advisory Council on Clean Air Compliance Analysis; Notification of Upcoming Public Teleconferences for Its Subcommittees and Special Panel and a Public Meeting for Its Special Panel and Air Quality Modeling Subcommittee

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

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SUMMARY: The EPA Science Advisory Board Staff Office is announcing a public meeting and a public teleconference of the Advisory Council on Clean Air Compliance Analysis Special Council Panel for the Review of the Third 812 Analysis (Council Special Panel). It is also announcing a public meeting and a public teleconference of the Council's Air Quality Modeling Subcommittee and a public teleconference for the Council's Health Effects Subcommittee.

DATES: October 15, 2003. A public teleconference for the Health Effects Subcommittee (HES) will be held from 11 a.m. to 12:30 p.m. (Eastern Time).

October 23, 2003. A public teleconference call meeting for the Council Special Panel will be held from 11 a.m. to 12:30 p.m. (Eastern Time).

October 24, 2003. A public teleconference call meeting for the Air Quality Modeling Subcommittee (AQMS) will be held from 11 a.m. to 12:30

p.m. (Eastern Time).

November 5-6, 2003. A public meeting for the Council Special Panel will be held from 8:30 a.m. to 6 p.m. November 5, 2003 and from 8:30 a.m. to 5 p.m. on November 6, 2003 (Eastern Time).

November 7, 2003. A public meeting for the AQMS will be held from 8:30 a.m. to 5 p.m. on November 7, 2003 (Eastern Time).

ADDRESSES: The meeting location for the November 5-6, 2003 meeting of the Council Special Panel and for the November 6-7, 2003 meeting of the AQMS will be in Washington, DC. The meeting location will be announced on the SAB website, <http://www.epa.gov/sab> in advance of the meeting. Participation in the teleconference meetings will be by teleconference only.

FOR FURTHER INFORMATION CONTACT: Members of the public who wish to obtain the call-in number and access code to participate in the teleconference meeting may contact Ms. Sandra

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Friedman, EPA Science Advisory Board Staff Office, at telephone/voice mail: (202) 564-2526; or via e-mail at: [friedman.sandra@epa.gov](mailto:friedman.sandra@epa.gov), or Ms. Delores Darden, EPA Science Advisory Board Staff Office at telephone/voice mail: (202) 564-2282; or via e-mail at [darden.delores@epa.gov](mailto:darden.delores@epa.gov). Any member of the public wishing further information regarding the Council Special Panel or the Council's Subcommittees may contact Dr. Angela Nugent, Designated Federal Officer (DFO), U.S. EPA Science Advisory Board (1400A), 1200 Pennsylvania Avenue NW., Washington, DC 20460; by telephone/voice mail at (202) 564-4562; or via e-mail at [nugent.angela@epa.gov](mailto:nugent.angela@epa.gov). General information about the SAB can be found in the SAB web site at <http://www.epa.gov/sab>.

#### SUPPLEMENTARY INFORMATION:

##### Background

Pursuant to the Federal Advisory Committee Act, Public Law 92-463, Notice is given that the Council Special Panel and the AQMS will each hold a public meeting and the HES will hold a public teleconference call, as described above, to advise the Agency on its plan to develop the third in a series of statutorily mandated comprehensive analyses of the total costs and benefits of programs implemented pursuant to the Clean Air Act.

Background on the Council Special Panel, the AQMS, and this advisory project was provided in a Federal Register notice published on February 14, 2003 (68 FR 7531-7534).

The Council Special Panel and the Council subcommittees will be providing advice on the review document, "Benefits and Costs of the Clean Air Act 1990-2020; Revised Analytical Plan for EPA's Second Prospective Analysis" currently found at the following website, maintained by EPA's Office of Air and Radiation at: <http://www.epa.gov/oar/sect812/> under the link "Study Blueprint and Charge Questions Electronic Copy." This link provides electronic access to the Revised Analytical Plan, the "change pages" given to the Council in July 2003, and the detailed review charge questions.

The public meeting for the Council Special Panel, described above is planned for the Council to provide advice to the Agency on remaining charge questions related to its review of the Revised Analytical Plan for EPA's Second Prospective Analysis. These charge questions include the Agency's plans for valuation and its plans for addressing uncertainties associated with the analysis.

The public teleconference for the Council Special Panel is planned to prepare the Council for its public meeting and to discuss the Council Special Panel draft report "Interim Installment: Review of the Revised Analytical Plan for EPA's Second Prospective Analysis" posted on the SAB website as a draft report (consult the following page: <http://www.epa.gov/science1/drrep.htm>).

The purpose of the public meeting for the AQMS is for the AQMS to provide advice on the Agency's plans for air quality modeling.

The public teleconference for the AQMS, also described above, is planned to prepare the AQMS for its public meeting, which will focus on the Agency's plans for air quality modeling.

The purpose of the public teleconference for the HES is to discuss a draft report entitled "Advisory on Plans for Health Effects Analysis in the Analytical Plan for EPA's Second Prospective Analysis--Benefits and Costs of the Clean Air Act, 1990-2020," developed during the HES public meeting on August 28-29, 2003. That meeting was previously announced in the Federal Register on July 30, 2003 (68 FR 44766-44767). The HES draft report will be posted on the SAB website (on the special page for Draft Reports at <http://www.epa.gov/science1/drrep.htm>) in advance of the meeting.

Agendas for the public meetings and teleconferences will be posted on the SAB website ten days before the dates of those events.

### Procedures for Providing Public Comment

It is the policy of the EPA Science Advisory Board (SAB) Staff Office to accept written public comments of any length, and to accommodate oral public comments whenever possible. The EPA SAB Staff Office expects that public statements presented at its meetings will not be repetitive of previously submitted oral or written statements.

Oral Comments: In general, each individual or group requesting an oral

presentation at a face-to-face meeting will be limited to a total time of ten minutes (unless otherwise indicated). For conference call meetings, opportunities for oral comment will usually be limited to no more than three minutes per speaker and no more than fifteen minutes total. Interested parties should contact the Designated Federal Official (DFO) identified above at least one week prior to the meeting in order to be placed on the public speaker list for the meeting. Speakers should bring at least 35 copies of their comments and presentation slides for distribution to the participants and public at the meeting. Written Comments: Although written comments are accepted until the date of the meeting (unless otherwise stated), written comments should be received in the SAB Staff Office at least one week prior to the meeting date so that the comments may be made available to the committee for their consideration. Comments should be supplied to the DFO at the address/contact information noted above in the following formats: one hard copy with original signature, and one electronic copy via e-mail (acceptable file format: Adobe Acrobat, WordPerfect, Word, or Rich Text files (in IBM-PC/Windows 95/98 format)). Those providing written comments and who attend the meeting are also asked to bring 35 copies of their comments for public distribution.

Meeting Accommodations: Individuals requiring special accommodation to access these meetings, should contact Dr. Nugent at least five business days prior to the meeting so that appropriate arrangements can be made.

Dated: September 30, 2003.  
Vanessa T. Vu,  
Director, EPA Science Advisory Board Staff Office.  
[FR Doc. 03-25404 Filed 10-6-03; 8:45 am]  
BILLING CODE 6560-50-P

**U.S. EPA Advisory Council on Clean Air Compliance Analysis  
Special Council Panel for the Review of the Third 812 Analysis  
Public Meeting  
November 5-6, 2003  
Hilton Washington Embassy Row  
2015 Massachusetts Avenue, NW  
Washington, DC 20036**

**Purpose:** (1) To receive an update on a draft report by the Council's the Health Effects Subcommittee (HES); (2) To review and take action on a Council Special Panel Report "Interim Installment: Review of the Revised Analytical Plan for EPA's Second Prospective Analysis - Benefits and Costs of the Clean Air Act 1990- 2020" and (2) to provide advice to the Agency on remaining charge questions related to its review of the Revised Analytical Plan for EPA's Second Prospective Analysis.

**Agenda**

**November 5, 2003**

8:30-8:35	Opening of Council Meeting	Dr. Angela Nugent, Designated Federal Officer, SAB Staff
8:35-8:40	Welcome	Dr. Vanessa Vu, Director SAB Staff Office
8:40-8:50	Review of meeting purpose, agenda, summary of Council activity to date, and summary of Remaining Charge Questions to be addressed by the Special Council Panel (Attachment A to this Agenda)	Dr. Trudy Cameron, Chair
8:50-9:00	Introduction of Members	
9:00-10:30	Background Briefings on Topics Requested by the Council Special Panel <ul style="list-style-type: none"> <li>- Update on Project Status and Timetable, Clarification of Key Terms</li> <li>- Update on Alternative Pathway and Scenario Planning</li> <li>- Discounting Methodologies in 812 Cost and Benefit Modeling</li> <li>- Discounting and Net Present Value Concepts and EPA Analytical policies</li> <li>- Particulate Matter Expert Elicitation Pilot Project</li> </ul>	Mr. James DeMocker, EPA  Mr. Jim Neumann, IEC Mr. Jim Neumann, IEC Dr. Albert McGartland  Ms. Lisa Conner
10:30-10:45	Break	
10:45-11:15	Update on HES Draft Report, other than Charge Question 29	Dr. Bart Ostro, Chair HES

11:15-11:45	Update on HES Draft Report Discussion of Charge Question 29 <sup>1</sup>	Dr. Nino Kuenzli, Chair of HES Discussion of Charge Question 29
11:45-1:30	Working lunch Charge Question 22: Expert-judgment project on VSL determinations  Charge Question 27: Pilot Project for estimating and reporting uncertainty in compliance cost	Lead Discussant: Dr. James Hammitt; Associate Discussant: Dr. Trudy Cameron Lead Discussant: Dr. Virginia McConnell; Associate Discussants: Dr. Charles Kolstad, Dr. Virginia McConnell, Dr. Warner North, Dr. John Evans
1:30-2:45	Charge Question 26: General advice regarding plans for estimating and reporting uncertainty associated with the costs and benefits	Lead Discussant: Dr. Warner North; Associate Discussants: Dr. John Evans, Dr. Dale Hattis, Dr. Lester Lave
2:45-3:00	Break	
3:00-3:30	Charge Question 21: Plans for economic valuation of changes in outcomes between scenarios	Lead Discussant: Dr. Reed Johnson
3:30-5:00	Update on Council's new Ecological Effects Subcommittee. Discussion of Economic Aspects of Charge Questions Related to Ecological Effects: (Charge Question 18: Plans for analysis described in chapter 7; Charge Question 19: Ecological Case Study; and Charge Question 20, Hedonic Property Studies)	Update from SAB Staff Office Lead Discussants: Dr. Lauraine Chestnut (Charge Question 18); Dr. Reed Johnson (Charge Question 19); and Dr. Kerry Smith (Charge Question 20)
5:00-5:15	90 minutes Summary of Action Items; Preparation for Next Day	Dr. Trudy Cameron
5:15	Adjourn	

<sup>1</sup> Charge Question 29: Does the Council support the plans described in chapter 9 for the expert elicitation pilot project to develop a probability-based PM2.5 C-R function for premature mortality, including in particular the elicitation process design? If the Council does not support the expert elicitation pilot project, or any particular aspect of its design, are there alternative approaches the Council recommends for estimating PM-related mortality benefits for this analysis, including in particular a probabilistic distribution for the C-R function to reflect uncertainty in the overall C-R function and/or its components?

**November 6, 2003**

8:00-8:10	Opening of Meeting/Administrative Business	Dr. Angela Nugent
8:10-8:15	Agenda Review	Dr. Trudy Cameron
8:15-8:45	Charge Question 23: Use of VSL estimates meta-analyses	Lead Discussant: Dr. Kerry Smith; Associate Discussant: Dr. Trudy Cameron
8:45-9:15	Charge Question 31: Plans for appropriate VSL measures	Lead Discussant: Dr. James Hammitt; Associate Discussant: Dr. Kerry Smith
9:15-9:45	Application of the Kochi et al. meta-analysis and other studies to derive value of avoided premature mortality:	Lead Discussant: Dr. Trudy Cameron; Associate Discussants: Dr. James Hammitt, Dr. Kerry Smith,
9:45-10:15	Charge Question 24: Plans for QALY-based cost-effectiveness	Lead Discussant: Dr. James Hammitt, Associate Discussants: Dr. Kerry Smith, Dr. John Evans
10:15-10:30	Break	
10:30-11:00	Charge Question 25: Valuation of Morbidity Effects	Lead Discussant: Dr. Lauraine Chestnut
11:00-12:00	Discussion of any remaining issues with draft report "Interim Installment: Review of the Revised Analytical Plan for EPA's Second Prospective Analysis - Benefits and Costs of the Clean Air Act 1990- 2020"	
12:00-1:30	Working Lunch	
	Continued Discussion of draft report	
	Discussion of Charge Question 1: Project Goals and Analytical Sequence and Identification of Points for Administrator's Cover Letter	
1:30-4:00	Continued Discussion and Council Writing Time	
4:00-4:15	Summary of Action Items	Dr. Trudy Cameron
4:15	Adjourn	

**Charge Questions for the Special Council Panel for the Review of the Third 812 Analysis Public Meeting, November 5-6, 2003**

**Excerpted from the List of 37 Charge Questions (Revised as of July 3, 2003) Provided to the Advisory Council on Clean Air Compliance Analysis**

Chapter 1: Project Goals and Analytical Sequence:

1. Does the Council support the study goals, general analytical framework, disaggregation plan, analytical sequence, and general analytical refinements defined in chapter 1? If there are particular elements of these plans which the Council does not support, are there alternatives the Council recommends?

Chapter 7: Ecological Effects

18. Does the Council support the plans described in chapter 7 for (a) qualitative characterization of the ecological effects of Clean Air Act-related air pollutants, (b) an expanded literature review, and (c) a quantitative, ecosystem-level case study of ecological service flow benefits? If there are particular elements of these plans which the Council does not support, are there alternative data or methods the Council recommends?
19. Initial plans described in chapter 7 reflect a preliminary EPA decision to base the ecological benefits case study on Waquoit Bay in Massachusetts. Does the Council support these plans? If the Council does not support these specific plans, are there alternative case study designs the Council recommends?
20. Does the Council support the plan for a feasibility analysis for a hedonic property study for valuing the effects of nitrogen deposition/eutrophication effects in the Chesapeake Bay region, with the idea that these results might complement the Waquoit Bay analysis?

Chapter 8: Economic Valuation

21. Does the Council support the plans described in chapter 8 for economic valuation of changes in outcomes between the scenarios? If there are particular elements of these plans which the Council does not support, are there alternative data or methods the Council recommends?
22. EPA's current analytic blueprint calls for an expert-judgment project on VSL determination that would produce a probability distribution over the range of possible VSL values for use in the 812 project. EPA is not sure how much priority to give to this project. A much simpler alternative would be for EPA to specify a plausible range of VSL values. One option would be to use a range bounded by \$1 million (based roughly on the lower bound of the interquartile range from the Mrozek-Taylor meta-analysis) and \$10 million (based roughly on the upper bound of the interquartile range of the Viscusi- Aldy meta-analysis. This range would match that reflected in EPA's sensitivity analysis of the alternative benefit estimate for the off-road diesel rulemaking. The range would then be characterized using a normal, half-cosine, uniform or triangular distribution over that range of VSL values. EPA would then ask this Committee to review this distribution. This approach could be done relatively quickly, based on the reviews and meta-analyses commissioned to date, and would allow a formal probability analysis to proceed, without suggesting that the Agency is trying to bring more precision to this issue than is warranted by the available science.
23. Pursuant to SAB Council advice from the review of the first draft analytical blueprint, EPA reviewed a number of meta-analyses –either completed or underway– developed to provide estimates for the value of statistical life (VSL) to be applied in the current study. EPA plans to consult with the Council (and coordinate this consultation with the EEAC) on how best to incorporate information from the Kochi et al (2002) meta-analysis, other published meta-analyses

[Mrozek and Taylor and Viscusi and Aldy], and recent published research to develop estimates of VSL for use in this study. In addition, EPA plans to implement two particular adjustments to the core VSL values: discounting of lagged effects and longitudinal adjustment to reflect changes in aggregate income. Does the Council support these plans, including the specific plans for the adjustments described in chapter 8? If the Council does not support these plans, are there alternative data or methods the Council recommends?

24. For the 812 Report, EPA has decided to perform a cost-effectiveness analysis of the Clean Air Act provisions using quality-adjusted life years as the measure of effectiveness. This is the standard approach used in medicine and public health and this type of analysis has previously been recommended by the SAB. Moreover, the recent NAS Report (2002) on benefits analysis discussed how this method could be applied to the health gains from air pollution control.
- a. Do you agree that QALYs are the most appropriate measure of effectiveness for this type of analysis? Would you suggest any alternative measures to replace or supplement the QALY measure? (This question relates to effectiveness measures, not monetary benefit measures as used in benefit-cost analysis).
  - b. OMB has suggested that EPA plan a workshop with clinicians, social scientists, decision analysts and economists to examine how the specific diseases and health effects in the 812 Report should be handled with respect to longevity impact and health-related preference. Participants would have knowledge of the relevant clinical conditions, the related health preference studies, and the stated-preference literature in economics. The recent RFF conference has laid the groundwork for this type of workshop. Is there a superior approach to making sure that the CEAQALY project is executed in a technically competent fashion and that the details of the work receive in-depth technical input in addition to the broad oversight provided by this Committee?
  - c. Does the Council support the specific plans for QALY-based cost-effectiveness described in the current draft blueprint? If the Council does not support specific elements of these plans, are the alternative data, methods, or results presentation approaches which the Council recommends?
25. EPA plans to use updated unit values for a number of morbidity effects, as described in chapter 8. Of particular note, EPA plans to rely on a study by Dickie and Ulery (2002) to provide heretofore unavailable estimates of parental willingness to pay to avoid respiratory symptoms in their children. This study is not yet published and has limitations concerning response rate and sample representativeness; however, EPA expects the study to be published prior to completion of the economic valuation phase of this analysis. Does the Council support the application of unit values from this study, contingent on its acceptance for publication in a peer-reviewed journal? If the Council does not support reliance on this study, are there other data or methods for valuation of respiratory symptoms in children which the Council recommends?

#### Chapter 9: Uncertainty Analysis

26. Does the Council support the plans described in chapter 9 for estimating and reporting uncertainty associated with the benefit and cost estimates developed for this study? If there are particular elements of these plans which the Council does not support, are there alternative data, models, or methods the Council recommends?
27. Does the Council support the plans described in chapter 9 for the pilot project to develop probability-based estimates for uncertainty in the compliance cost estimates? If the Council does not support this pilot project, or any particular aspect of its design, are there alternative approaches to quantifying uncertainty in cost estimates for this analysis which the Council recommends?
28. Does the Council support the plans described in chapter 9 for the pilot project to develop probability-based estimates for uncertainty in the emissions and air quality modeling estimates? If the Council does not support this pilot project, or any particular aspect of its design, are there alternative

approaches to quantifying uncertainty in emissions and/or air quality concentration estimates for this analysis which the Council recommends?

31. EPA plans to work with the Council and the EEAC to develop revised guidance on appropriate VSL measures. We hope to include the Kochi et al (2002) meta-analysis, other recent meta-analysis, recent publications, and the 3 literature reviews sponsored by EPA.(a separate charge question pertaining to this element of EPA's VSL plan is presented below). In addition, EPA plans to conduct a follow-on meta-regression analysis of the existing VSL literature to provide insight into the systematic impacts of study design attributes, risk characteristics, and population attributes on the mean and variance of VSL. Does the Council support the plans described in chapter 9 for conducting this meta-regression analysis? If the Council does not support this analysis or any particular aspect of its design, are there alternative approaches which the Council recommends for quantifying the impact of study design attributes, risk characteristics, and population attributes on the mean and variance of VSL?

#### Appendix H: Meta-analysis of VSL

37. Does the Council support including the Kochi et al. (2002) meta-analysis as part of a the larger data base of studies to derive an estimate for the value of avoided remature mortality attributable to air pollution? Are there additional data, models, or studies the Council recommends? Does the SAB think that EPA should include Kochi et al. 2003 if not accepted for publication in a peer reviewed journal by the time the final 812 report is completed?